Building Technologies Office Peer Review Program 2024

October 21–24, 2024
Arlington, Virginia
Hyatt Regency Crystal City

U.S. DEPARTMENT OF ENERGY | Office of ENERGY EFFICIENCY & RENEWABLE ENERGY
BUILDING TECHNOLOGIES OFFICE

2024 PROJECT PEER REVIEW
U.S. DEPARTMENT OF ENERGY
BUILDING TECHNOLOGIES OFFICE

WELCOME!

Dear Friends and Colleagues,

Welcome to the 2024 U.S. Department of Energy (DOE) Building Technologies Office (BTO) Peer Review. I'm confident this will be an engaging and successful week of networking and collaboration toward innovative solutions that save us energy, protect our environment, and create good-paying jobs.

To help meet our nation's ambitious decarbonization goals, DOE released a blueprint outlining its strategy to reduce on-site energy use intensity in buildings by 50% by 2050 vs. 2005, reduce on-site greenhouse gas emissions by 75%, and reduce embodied emissions from materials and construction by 90%. Additionally, we are striving to reduce electrical infrastructure costs by tripling the demand flexibility potential by 2050 vs. 2020.

We can't meet these goals without your help. That's why we are partnering with you to develop, demonstrate, and accelerate cost-effective technologies, techniques, tools, and services adoption, moving toward an equitable transition to a decarbonized energy system.

BTO relies on the Peer Review to gather rigorous, independent assessments of its research portfolio to ensure all projects remain relevant, effective, and aligned with DOE's goals. The Peer Review also offers a unique chance for external stakeholders to learn more about BTO's projects, provide recommendations, and explore potential partnerships. This event informs BTO's strategic decision-making, including budgets, funding opportunities, scope, focus, and direction.

BTO needs your unique skills, perspectives, and ideas to achieve its objectives and drive continued innovation. I look forward to the discussions and feedback in the coming days, and I hope this event will spark your creativity and push us further in our goal of a decarbonized buildings industry.

Sincerely,

Hayes Jones
Acting Director,
Building Technologies Office

SPEAKERS

Hayes Jones, Acting Director, BTO

Hayes Jones currently serves as the acting director of the Building Technologies Office (BTO). BTO develops, demonstrates, and accelerates the adoption of cost-effective technologies, techniques, tools, and services that enable energy-efficient and demand-flexible residential and commercial buildings, in support of an equitable transition to a decarbonized energy system by 2050, starting with a decarbonized power sector by 2035.

In her permanent role, Hayes is the program manager for the Commercial Buildings Integration (CBI) team. The CBI team works to increase energy efficiency and decarbonization of commercial buildings as well as voluntary adoption of energy-efficient technologies and practices in commercial buildings, serving as a critical "market stimulation" and "market feedback" link between BTO's Emerging Technologies and Codes and Standards programs. CBI demonstrates and deploys replicable and scalable solutions through testing, demonstration, and deployment of turnkey energy-efficiency and climate-responsive technology packages, scaled in partnership with community-level organizations.

Before coming to BTO, Hayes served as the program manager for Resilience, Security and Agency Engagement for the DOE's Federal Energy Management Program (FEMP). In this role, she led a team focused on developing resources for security of facility-related control systems and developing a systematic approach to agency and site resilience planning that helps organizations assess current infrastructure against risk and prioritize solutions for implementation.

Hayes has been with DOE for 16 years, serving in various roles in FEMP in operations, budget, and communications. She holds a master's degree in environmental management and a bachelor's degree from Duke University.

Ram Narayanamurthy, Deputy Director, BTO

Ram Narayanamurthy is the deputy director of BTO and has more than two decades of experience in development and deployment of building technologies. At BTO, he leads development and implementation of the R&D portfolio. He led the goal setting for *Decarbonizing the U.S. Economy by 2050: A National Blueprint for the Buildings Sector* and the Affordable Home Energy Shot™. He has also worked to shape efforts on the grid transition required for enabling building, industrial, and transportation decarbonization.

Prior to DOE, Ram led the buildings program at the Electric Power Research Institute (EPRI), where his team focused on strategies for decarbonization of the building stock in both existing and new construction, based on large-scale deployments. In addition, he was director of product development for Ice Energy, where his work led to the development of the Ice Bear, one of the first packaged thermal energy storage systems for light commercial buildings. This product was awarded ASHRAE product of the year in 2005 and 2010. In addition, as chief science officer for EchoFirst, Ram worked on integrated home energy management systems, solar photovoltaics, and solar thermal technologies. His team developed and deployed some of the first smart thermostats and implemented integrated ventilation and HVAC strategies to reduce building energy use.

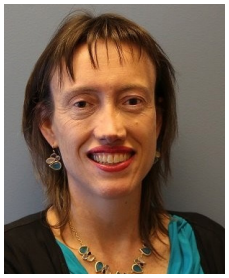
Ram has worked extensively with cities and state organizations such as the California Energy Commission and the New York State Energy Research and Development Authority to advance building decarbonization. He holds 27 patents across a breadth of building technologies, including HVAC, water heating, solar, and controls. He has a master's degree in mechanical engineering from the Pennsylvania State University and a bachelor's degree in mechanical engineering from the Indian Institute of Technology.

Nate Allen, Acting Program Manager, Commercial Buildings Integration

Nathaniel (Nate) Allen is the acting program manager for Commercial Buildings Integration within BTO. In this role he manages a portfolio of technology adoption, validation, and technical assistance initiatives to advance decarbonization of U.S. commercial buildings.

Nate brings over 15 years of experience working at the intersection of building efficiency and sustainability, public policy, and education to his work at DOE. He received a B.A. from the University of Pennsylvania, where he was the captain of the heavyweight rowing team, and holds an MBA from the Darden School of Business at the University of Virginia.

Amy Royden-Bloom, Program Manager, Residential Buildings Integration



Amy Royden-Bloom is the program manager for Residential Buildings Integration (RBI) within BTO. BTO's residential programs include research, analysis, information, and partnerships geared toward developing and scaling energy-efficiency technologies and approaches that improve the affordability and comfort of our nation's 120 million residential buildings, while reducing their carbon footprint and energy consumption.

Before joining RBI in 2022, Amy spent nine years managing the State Energy Program, which provides funding and technical assistance to states, territories, and the District of Columbia to enhance energy security, advance state-led energy initiatives, and maximize the benefits of increasing energy affordability. She also has experience in implementing the Clean Air Act from her position as senior staff associate at the National Association of Clean Air Agencies. Amy holds a law degree from Harvard Law School and a B.A. degree in economics and Spanish from the University of Virginia.

Jeremy Williams, Acting Program Manager, Building Energy Codes

Jeremy Williams oversees BTO's activities supporting advanced energy efficiency and decarbonization through Building Energy Codes, which establish standards for energy use and environmental performance in residential and commercial buildings.

Since 2011, Jeremy has represented DOE in its building code research, development, and analysis activities, including participation in the International Energy Conservation Code (IECC) and Standard 90.1. He is a member of the IECC Residential and Commercial Energy committees as well as the Standard 90.1 and National Green Building Standard technical committees. Jeremy also oversees DOE's code technical analysis and assistance work, which supports state and local governments in successfully implementing their codes. He has a particular interest in energy code compliance and validating the impacts of codes in the field, and ensuring their benefits are realized by U.S. homes and businesses.

Jeremy holds a master's degree in construction management from Michigan State University and a bachelor's degree in business and education. Jeremy is also a college adjunct instructor teaching courses in construction management, and a former high school chemistry and physics teacher.

Lucas Adin, Program Manager, Appliance and Equipment Standards Program

Lucas Adin is manager of BTO's Appliance and Equipment Standards Program, which includes energy conservation standards analysis, test procedure development (covered products and ENERGY STAR® products), and certification and enforcement (covered products and ENERGY STAR products) In his eight-plus years with the program, he has managed energy efficiency rulemaking activities across a range of covered products, served as a representative for DOE in negotiations with stakeholders on prospective new standards, managed DOE's compliance and enforcement activities, and served as the Designated Federal Official for the Appliance Standards and Regulations Advisory Committee (ASRAC), DOE's Federal advisory committee for appliance efficiency regulations.

Prior to his current position, Lucas worked for the Navy Energy Program, where he directly managed a portfolio of energy R&D projects and served as the office's lead coordinator of energy-related activities across a variety of Navy and interservice organizations. He also served for five years as an active duty submarine officer in the U.S. Navy.

Lucas holds a degree in political science from the U.S. Naval Academy and a Master of Public Policy from Georgetown University.

Brian Walker, Program Manager, Emerging Technologies

Brian Walker is the Emerging Technologies program manager within BTO. He has worked for more than 15 years advancing sustainability through technology and policy.

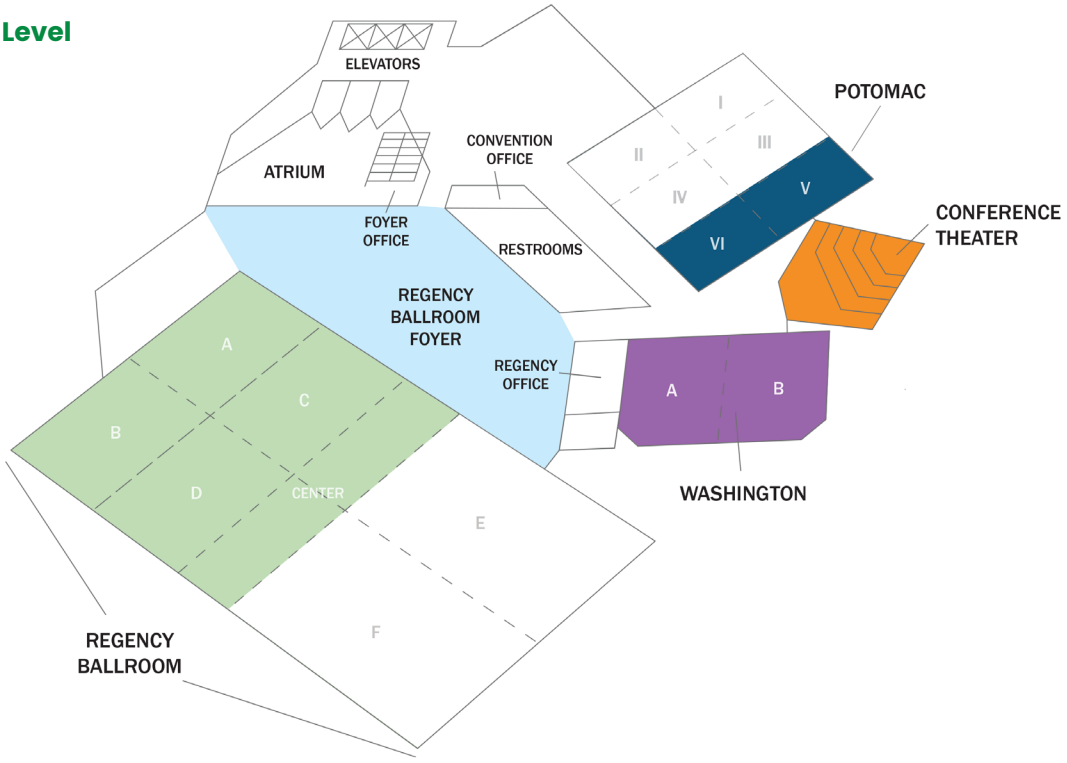
Prior to this role, Brian managed a portfolio of strategic analysis projects. Along with partners, he examined industrial energy use, global supply chains, and factors driving asset valuation. He was an author of the Fourth National Climate Assessment, and he served as the U.S. representative to the Energy Efficiency Working Party at the International Energy Agency.

Most immediately, Brian was the technology manager for building controls and grid-edge decarbonization. As manager for solid-state lighting he helped develop the recent L-Prize™, which has drawn new entrants and approaches to lighting, from concepts to prototypes to manufacturing and deployment.

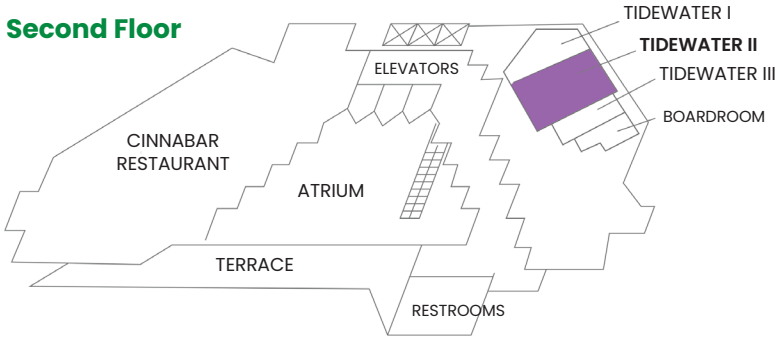
Before joining DOE, Brian invented new materials, built devices, and studied the physics of sustainable energy at the University of Cambridge. He has a B.A. from Cornell University and a Ph.D. from Massachusetts Institute of Technology, where his advisor won the 2023 Nobel Prize in Chemistry.

EVENT MAP

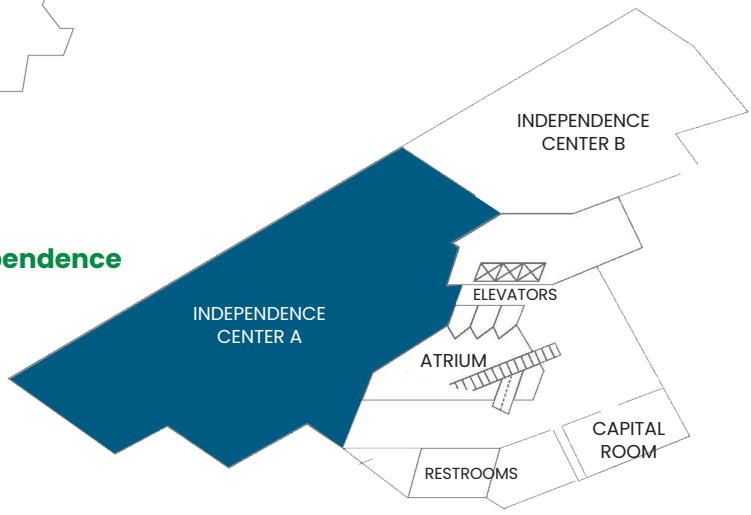
Ballroom Level



Second Floor



Independence Level



SPECIAL SESSIONS

This year's Peer Review will feature the following sessions to showcase BTO efforts and to facilitate direct engagement between BTO and stakeholders.

Monday, October 21, 2024

Welcome
9:00 - 9:30 am ET, Regency Ballroom

Emerging Technologies Overview
9:40 - 11:40 am ET, Conference Theater

This session will provide an overview of R&D roadmaps and opportunity documents, both recent and in progress, for several technologies.

Lunch Plenary - DOE Keystone Initiatives and Fireside Chat with State Leaders
1:00 - 2:40 pm ET, Regency Ballroom

Dr. Geraldine Richmond, DOE Under Secretary for Science and Innovation, will provide opening remarks, followed by a fireside chat hosted by Dr. Carolyn Snyder, DOE Deputy Assistant Secretary for Buildings and Industry. California Energy Commissioner Andrew McAllister, Anthony Fiore, chief program officer of the New York State Energy Research and Development Authority (NYSERDA), and Heather Clark, senior director of the building sector in the White House Climate Policy Office, will discuss with Dr. Snyder progress and future plans related to building decarbonization and opportunities for further collaboration.

Affordable Home Energy Shot
2:40 - 3:20 pm ET, Tidewater II

This session will explore the Affordable Home Energy Shot initiative and foster collaborative discussions on innovations that can address the challenges of decarbonizing affordable housing.

Tuesday, October 22, 2024

Blueprint, Pathways, and BTO Priorities
9:00 - 10:30 am ET, Regency Ballroom

The Building Technologies Office leadership team will outline BTO priorities in the context of the National Blueprint for Decarbonizing Buildings, and also introduce a new interactive dashboard that segments building emissions and energy use through 2050 to identify key pathways for buildings sector decarbonization.

Low GWP Refrigerants
4:00 - 6:00 pm ET, Conference Theater

This session will highlight the efforts underway to prime the market for ultra-low global warming potential (GWP) refrigerants. The session will include two panels, one featuring leading states' efforts related to ultra-low GWP refrigerants and a second highlighting research and development efforts underway to enable use of the lowest GWP refrigerants.

SPECIAL SESSIONS

Wednesday, October 23, 2024

Plenary - Building Technology Industry Leaders
11:30 am - 1:00 pm ET, Regency Ballroom

Supercharged and Grid Integration
1:50 - 3:50 pm ET, Tidewater II

This session will be a short seminar and an interactive audience discussion designed to introduce EERE and DOE's work to coordinate and integrate the grid edge, the portion of the electric grid where new loads, distributed energy resources, electricity use, and customer behavior are all rapidly changing.

Building Energy Equity and Environmental Justice Across the CBI Portfolio
4:40 - 6:40 pm ET, Tidewater II

This session will explore innovative strategies for embedding energy justice and equity into the BTO portfolio, with a focus on best practices for meaningfully engaging underserved communities in commercial building technology deployment.

Thursday, October 24, 2024

Decarbonization of Thermal Networks for Large Commercial Buildings
9:00 - 11:00 am ET, Conference Theater

In this session, DOE and partners will talk about their work to develop pathways to substantially reduce emissions from thermal systems in large commercial buildings and provide input on replicable strategies for further development and deployment.

Advancing Heat Pumps in BTO
11:20 am - 12:40 pm ET, Tidewater II

This session will give participants an overview of the work to date on residential and commercial challenges and an introduction to the latest commercial rooftop unit (RTU) standards.

AGENDA

As of 10/11/2024

Monday, October 21, 2024

Eastern Time	Washington A	Washington B	Conference Theater	Potomac V/VI	Tidewater II
8:00-8:55 AM	Breakfast				
9:00-9:30 AM	**Welcome (Regency Ballroom)**				
9:30-9:40 AM	Break, travel time				
9:40-10:20 AM			**Emerging Technologies (ET) Overview Session**	RBI - Solar Decathlon Competition; **Taylor Ryan, NREL**	Analysis - BuildStock Core + BuildStock Standard Data Release (SDR) || Electric Vehicle Load Shape ResStock Integration; **Andrew Parker, NREL**
10:20-11:00 AM		ET - HVAC; Predictive Device-level Control and Optimal Sizing of Integrated Heat Pump Systems for Deep Decarbonization and Energy Resilience; **Veronica Adetola, PNNL**		RBI - Homeowner/Renter Upgrade Survey; **Chrissi Antonopoulos, PNNL**	BTO Wide - Multi-lab: Scout; **Chioke Harris, NREL**
11:00-11:40 AM		ET - HVAC; Cold Climate Heat Pump using Vapor Compression Cycle Cascaded with a Thermoelectric Heat Pump; **Sreenidhi Krishanamoorthy, EPRI**		ET - Controls; Equity-focused Control Solutions for Affordable, All-Electric Multifamily Housing; **Xin Jin, NREL**	
11:40-12:20 PM	ET - HVAC; Multi-functional Equipment for Direct Decarbonization with Improved Indoor Air Quality (IAQ); **Kashif Nawaz, ORNL**	ET - HVAC; Compressor is a Sensor; **Zhenning Li, ORNL**		ET - Controls; EE & Demand Flexibility State-level Potential: Expanding the Results; **Janghyun Kim, NREL**	BTO Wide - Multi-lab: Building Standard Scenarios; **Jared Langevin, LBNL**
12:20-1:00 PM	Lunch				
1:00-2:40 PM	**Lunch Plenary - DOE Keystone Initiatives and Fireside Chat with State Leaders (Regency Ballroom)**				
2:40-3:20 PM	ET - HVAC; MaxTech HPWH using ultra-low GWP refrigerants; **Kashif Nawaz, ORNL**	ET - HVAC; High Temperature Combination Heat Pumps for Low-Cost Electrification - FY22 Lab Call; **Nelson James, NREL**	ET - Envelope; Next Generation Wall Retrofit Panels with Integrated VIPS; **John Peavey, Home Innovation Research Labs**	ET - Controls; Differentiable Predictive Control; **Draguna Vrabie, PNNL**	**Affordable Home Energy Shot Session**
3:20-4:00 PM	ET - HVAC; Flexible HP WH with embedded energy storage (CRADA AOS); **Jian Sun, ORNL**	ET - HVAC; Higher Efficiency, Demand Flexible Refrigerator with On Demand Micro- Vibrational Deicing Technology; **Ayyoub Momen, Ultrasonic Technologies Solutions**	ET - Envelope; Mass Customization of Prefabricated Panel Blocks for Deep Wall Insulation Retrofits; **Kurt Roth, Fraunhofer USA**	ET - Controls; Multi-Lab (PNNL, LBNL): Understanding the Human Element in Advanced Roof-Top Unit Controls Adoption; **Meghan McNulty, PNNL, Shreya Agarwal, LBNL**	
4:00-4:40 PM	ET - HVAC; Cost compression for multifamily heat pump water heaters - FY22 Lab Call; **Joseph Rendall, ORNL**	ET - HVAC; Low Charge Heat Pump Water Heater Using Propane; **Bo Shen, ORNL**	ET - Envelope; R-5+ Retrofit Cladding System With Low-Cost Clay Cellulose Insulation; **Lida Lu, Liatris**	ET - Controls; Multi-Lab (ORNL, PNNL): Development and Validation of Low-Cost, Interoperable, User-Centric, Supervisory Controller Kit for SmBoth and Medium Size Commercial Buildings (OneKit); **Jaime Lian, ORNL, Srinivas Katipamula, PNNL**	
4:40-5:20 PM	ET - HVAC; Reduced Cost Heat Pump Space and Water Heating in Cold Climates; **Iain Walker, LBNL**	ET - HVAC; 120V heat pump water heating replacement solution for 30–40-gallon gas water heaters; **Kyle Gluesenkamp, ORNL**	ET - Envelope; Hemp Retrofit SIPS (HeRS) Hemp-based Insulated Siding for Residential Retrofit Applications; **Alexandro Tsamis, Rensselaer Polytechnic Institute**	ET - Controls; Scalable Load Management using Reinforcement Learning; **Helia Zandi, ORNL**	
5:20-5:30 PM	Break				
5:30-7:00 PM	**Poster Session (Independence)**				
End					

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As of 10/11/2024

Tuesday, October 22, 2024

Eastern Time	Washington A	Washington B	Conference Theater	Potomac V/VI	Tidewater II
8:00-8:55 AM	Breakfast				
9:00-10:30 AM	**Poster Session (Independence) Blueprint, Pathways, and BTO Priorities Session (Regency Ballroom)**				
10:30-10:50 AM	Break				
10:50-11:30 AM	ET - HVAC; Ice storage for efficient and flexible decarbonization of hydronic space heating - FY22 Lab Call; **Jason Woods, NREL**	ET - HVAC; High-performance Lower-cost Plastic Heat Exchangers; **Pinakin Patel, T2M Global LLC**	ET - Envelope; Multilayer foil as DIY exterior insulation; **Mikael Salonvaara, ORNL**	ET - Controls; Program-Level Overview; **Amir Roth, BTO**	RBI; Field Validation and Market Transformation of HP and HPWHs: Grid Enabled HPs in Alaska; **Chitra Nambiar, PNNL**
11:30-12:10 PM	ET - HVAC; Quantifying and Reducing Electricity Use - Defrost; **Jason Woods, NREL**	ET - HVAC; High Payoff 3D Printed Ceramic Heat Exchangers for HVAC; **Taylor Shoulders, Technology Assessment & Transfer, Inc.**	ET - Envelope; Low-carbon fire retardants for low-carbon building materials; **Zoriana Demchuk, ORNL**	ET - Controls; XETO; **Brian Frank, Project Haystack**	RBI; Field Validation and Market Transformation of HP and HPWHs: Demonstration of 120V HPWHs; **Joshua Butzbaugh, PNNL**
12:10-12:50 PM	ET - HVAC; BTRIC Technical Collaboration Program; **Melissa Lapsa, ORNL**	ET - HVAC; Microencapsulated Carbon Sorbents (MECS) for Distributed Carbon Capture in Buildings; **Jaya Rao, ADC Technology**	ET - Envelope; Flat and Level Analysis Tool (FLAT); **Nolan Hayes, ORNL**	ET - Controls; Multi-lab: ASHRAE 223P: Semantic Modeling; **Avijit Saha, NREL, Lazlo Paul, LBNL**	RBI; Field Validation and Market Transformation of HP and HPWHs: Quality Installation Tool; **Edward Louie, PNNL**
12:50-1:50 PM	Lunch				
1:50-2:30 PM	ET - HVAC; International HVAC&R Research Collaboration through IEA and IIR; **Brian Fricke, ORNL**	ET - HVAC; GEB by ME: Grid-interactive Efficient Buildings by Modular Design of Plug-andplay Equipment; **Kyle Gluesenkamp, ORNL, Michael Poplawski, PNNL**	ET - Envelope; Deep learning for Point cloud Building Envelope Segmentation (DeeP-CuBES); **Bryan Maldonado, ORNL**	ET - Controls; Multi-lab: ASHRAE 231P: OpenBuilding Control; **Michael Wetter, LBNL**	RBI; Remotely: A Home Energy Score App; **Veronique Bugnion, ClearlyEnergy**
2:30-3:10 PM	ET - HVAC; Heat Pump and Heat Pump Water Heater National Partnership Project; **Cheryn Metzger, PNNL**	ET - HVAC; FY 20 BENEFIT FOA - Grid Interactive Micro- Distributed Refrigerated Display Case; **Ramin Faramarzi, NREL**	ET - Envelope; Integrated Retrofit Solutions for Residential and Commercial Buildings; **Diana Hun, ORNL**	ET - Controls; Alfalfa; **Anya Petersen, NREL**	RBI; Housing Characteristic-based Design Guidance on HP Selection and Set-up for Decarbonization; **Jon Winkler, NREL**
3:10-3:50 PM	ET - HVAC; Residential Cold Climate Heat Pump Field Validation and Market Transformation; **Vrushali Mendon, PNNL**	ET - HVAC; Equitable Decarbonization and Evaluation Program; **Judy Min, ecoLong**	ET - Envelope; Low-Carbon, Fire Resilient Exterior Siding; **Nolan Hayes, ORNL**	ET - Controls; Multi-lab: BOPTEST; **David Blum, LBNL**	RBI; Educating Zero Energy Professionals; **Taylor Ryan, NREL**
3:50-4:00 PM	Break				
4:00-4:40 PM			**Low GWP Refrigerants Session**	ET - Controls; Multi-lab: VOLTTRON; **Shwetha Niddodi, PNNL**	RBI; Home Energy Score; **Noel Merket, NREL**
4:40-5:20 PM				ET - Controls; Accelerating Fault-free Optimal Control; **Jessica Granderson, LBNL**	RBI; Home Energy Score; **Charlie Holly, PNNL**
5:20-6:00 PM				ET - Controls; CEL - Easy Does It (SBIR pII); **Tanya Barham, Community Energy Labs**	RBI; MW ASHP Collaborative; **Molly Graham, Midwest Energy Efficiency Alliance**
End					

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As of 10/11/2024

Wednesday, October 23, 2024

Eastern Time	Washington A	Washington B	Conference Theater	Potomac V/VI	Tidewater II
8:00-8:55 AM	Breakfast				
9:00-9:40 AM		ET - HVAC; FY20 BENEFIT FOA - Hybrid Manufacturing for High Performance Air-to-Refrigerant Heat Exchangers; **Vikrant C. Aute, Yoram Shabtay, University of Maryland**	ET - Thermal Energy Storage (TES); THERMAplus, Tunable TES for Different Applications and Climate Zones; **Malcolm Grieve, MicroEra Power**	ET - Building Energy Modeling (BEM); Program-Level Overview; **Amir Roth, BTO**	RBI; Developing and Deploying a Cost Effective Residential Automated Fault Detection and Diagnostics; **Piljae Im, ORNL**
9:40-10:20 AM		ET - HVAC; Manufacturing and Deployment of Liquid Desiccant Dehumidifier with Multiple Regeneration Technologies;**Jason Woods, NREL**	ET - TES; High Energy Density Hydrogel Thermo-Adsorptive Storage; **Bachir El Fil, Massachusetts Institute of Technology**	ET - BEM; Multi-lab: EnergyPlus; **Edwin Lee, NREL**	RBI; Florida Solar Energy Center - PV-GEMS: PV-Powered, Grid Enhanced Mechanical Solutions; **Eric Martin, University of Central Florida**
10:20-11:00 AM	ET - HVAC; Virtual Sensorbased FDD and Control Suite for Widespread Adoption of Residential Embedded-FDD Heat Pumps; **Donghun Kim, LBNL**	ET - HVAC; Super-Efficient Air- Conditioning Unit; **Demis Pandelidis, Baryon Inc.**	ET - TES; Multi-Lab: Development of advanced thermochemical-based thermal energy storage for heating electrification; **Sumanjeet Kaur, LBNL**	ET - BEM; Multi-lab: Spawn; **Michael Wetter, LBNL**	RBI; A Recipe for ABC Multifamily Retrofits: Technologies, Financing, and Project Delivery; **Maggie Huang, RMI**
11:00-11:20 AM	Break				
11:30-1:00 PM	**Plenary - Building Technology Industry Leaders (Regency Ballroom)**				
1:00-1:50 PM	Lunch				
1:50-2:30 PM	ET - HVAC; Novel Compact Flooded Evaporators for Commercial Refrigeration; **Muneesh Murugan, ORNL**	ET - Technology-to-Market (T2M); IMPEL+; **Reshma Singh, LBNL**	ET - TES; Multi-Lab: Develop an open-source TES Sizing, Benefits and Decision Tool (TESSBeD); **Chuck Booten, NREL**	ET - BEM; Multi-lab: URBANopt; **Ben Polly, NREL**	**Supercharged and Grid Integration Session**
2:30-3:10 PM	ET - HVAC; High Temperature Heat Pump for Commercial Space and Water Heating; **Kashif Nawaz, ORNL**		ET - TES; Multi-Lab: Developments and tests of advanced controls for TES integrated with HVAC systems; **Xiaobing Liu, ORNL**	ET - BEM; Multi-lab: OpenStudio; **David Goldwasser, NREL**	
3:10-3:50 PM	ET - HVAC; Commercial Space Cooling/Direct Air Capture System with Waste Heat Utilization; **Steve Kowalski, ORNL**	ET - T2M; Prototype to Pilot; **Yeon Jin Bae, ORNL**	ET - TES; Multi-Lab: Plug-and-play thermal switches with thermal storage; **Ravi Kishore, NREL**	ET - BEM; Multi-lab: ASHRAE 140: BEM Engine Testing; **Ralph Muehleisen, ANL**	
3:50-4:00 PM	Break				
4:00-4:40 PM	ET - HVAC; Multiphysics modeling of heat pump components; **Katherine Asztalos, ANL**	ET - T2M; Building Business Network (B-BIZ); **Rachel Romero, NREL**	ET - TES; Multi-Lab: Load shifting and resiliency for refrigerated display cases; **Jason Woods, NREL**	ET - BEM; Multi-lab: ASHRAE 205: HVAC Performance Maps; **Ralph Muehleisen, ANL**	RBI - Buildings Upgrade Prize; **Sarah Truitt, NREL**
4:40-5:20 PM	ET - HVAC; Seamlessly Fuel- Flexible Heat Pump; **Steve Kowalski, ORNL**		ET - TES; Multi-Lab: Small and medium commercial, Space Heating/Cooling HP + PCM TES; **Spencer Dutton, LBNL**	ET - BEM; ASHRAE Standard 229P: BEM Ruleset Testing; **Supriya Goel, PNNL**	**Building Energy Equity and Environmental Justice Across the CBI Portfolio Session**
5:20-6:00 PM	ET - HVAC; High-Efficiency Air- Source Multi-Stage Cold- Climate Integrated Heat Pump; **Bo Shen, ORNL**		ET - TES; Multi-Lab: Residential heat pump with thermal energy storage to enable grid decarbonization; **Kyle Gluesenkamp, ORNL**	ET - BEM; IBPSA-USA; **Cindy Regnier, Dimitri Contoyannis, LBNL**	
6:00-6:40 PM	ET - HVAC; Detailed Air Source Heat Pump Evaluation for Very Cold Climates; **Jeff Munk, NREL**			ET - BEM; AIA 2030; **Cindy Regnier, Kevin Settlemyre, LBNL**	
End					

AGENDA

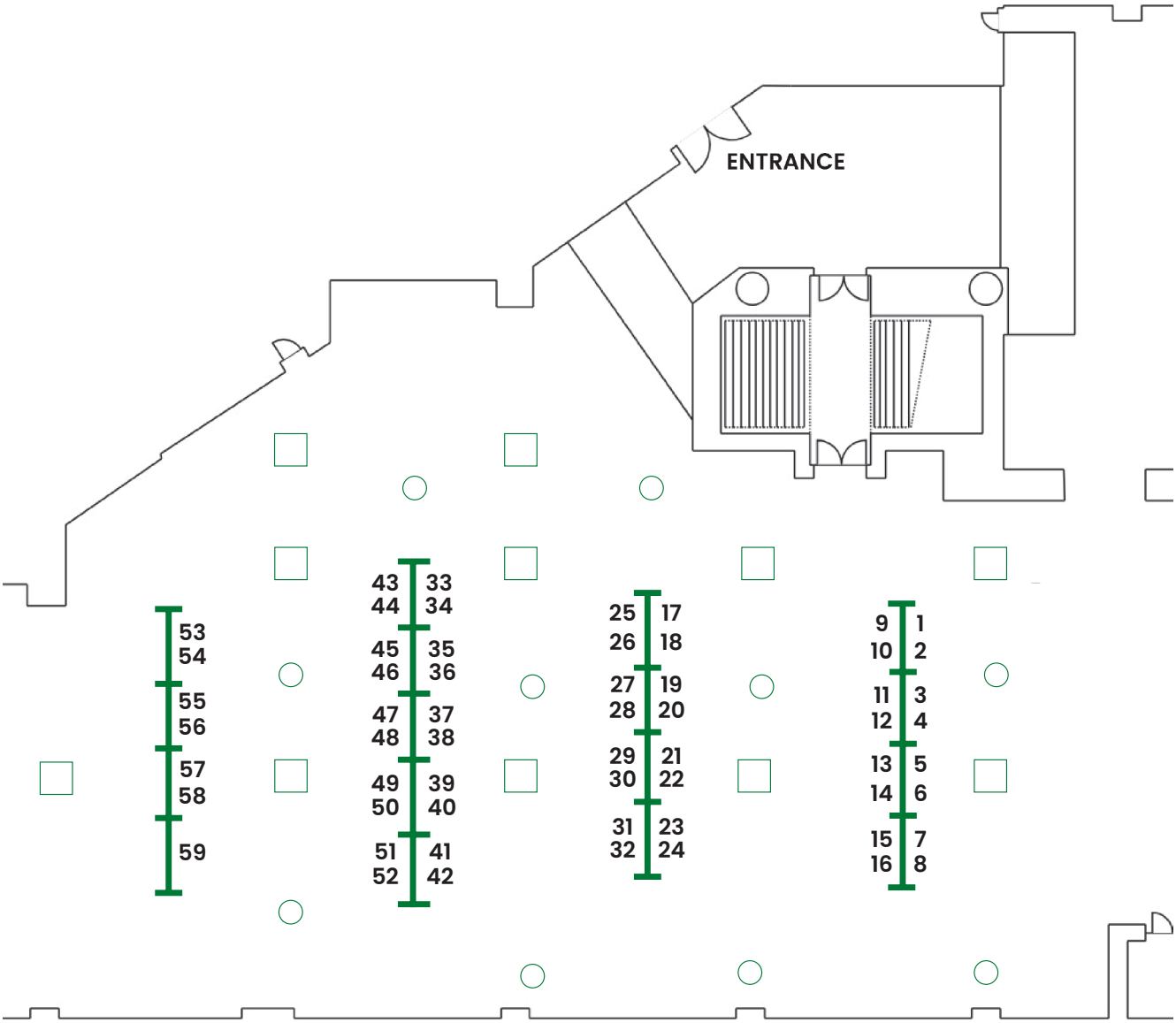
As of 10/11/2024

Thursday, October 24, 2024

Eastern Time	Washington A	Washington B	Conference Theater	Potomac V/VI	Tidewater II
8:00-8:55 AM	Breakfast				
9:00-9:40 AM	ET - HVAC; Heat exchanger solutions for low GWP refrigerants; **Cheng-Min Yang, ORNL**	Building America, **Kyle Biega**	**Decarbonization of Thermal Networks for Large Commercial Buildings Session**	ET - Connected Communities; IBACOS; **Ari Rapport, Floyd Keneipp**	RBI - ABC Collaborative Award; **Lucas Toffoli, RMI**
9:40-10:20 AM	ET - HVAC; Compressors for Refrigerants with low GWP; **Samuel Yana Motta, ORNL**			ET - Connected Communities; Spokane Edo; **Easan Drury**	CBI - Integrated Whole-Building Energy Efficiency Retrofit Solution for Residences in Cold/Very Cold Climates; **Elizabeth Krietemeyer, Syracuse University**
10:20-11:00 AM	ET - HVAC; Next Generation Low Cost Direct-Expansion Heat Pumps Using low GWP Refrigerant Mixtures; **Zhenning Li, ORNL**			ET - Connected Communities; Slipstream; **Scott Schuetter**	CBI - Innovative Technologies to Overcome Interface Challenges for Wall Retrofit Systems; **Zoe Kaufman, NREL**
11:00-11:20 AM	Break				
11:20-12:00 PM		Building America, **Kyle Biega**	ET - Building Electric Appliances, Devices, and Systems (BEADS); Grid- Supportive End-Use Electronics; **Michael Blonsky, NREL**	ET - Connected Communities; The Ohio State University; **Allison MacKay**	**Advancing Heat Pumps in BTO Session**
12:00-12:40 PM			ET - BEADS; Recycled Reinforced Composite Oven; **Ahmed Hassen, ORNL**	ET- Connected Communities; Open Market ESCO; **Christina McPike, Darien Crimmin**	
12:45-1:40 PM	Lunch				
1:40-2:20 PM	ET - HVAC; Pool boiling heat transfer for low GWP refrigerants; **Cheng-Min Yang, ORNL**	Building America, **Kyle Biega**	ET - BEADS; All-Metal Induction Cooking; **Vandana Rallabandi, ORNL**	ET - Connected Communities; PacifiCorp; **James Campbell**	CBI - South El Monte Autonomous Building Controls Retrofit; **Andres Gonzalez, City of South El Monte, CA**
2:20-3:00 PM	ET - HVAC; Enabling CO2 Isothermal Compression Using Liquid Piston within Integrated Gas Cooler; **Reinhard Radermacher, University of Maryland**		ET - BEADS; Optimized Commercial Control Technology Of Plug-loads & lighting; **Jan Kleissl, UC San Diego**	ET - Connected Communities; EPRI; **Siva Sankaranarayanan**	CBI - Refrigeration Energy Management (REM): Field Validation of an Integrated Refrigeration Energy Management Technology for Controls, Active Demand Response, and Continuous Commissioning in Grocery Stores; **Steven Chybowski, Rhode Island Office of Energy Resources**
3:00-3:40 PM	Ultra-Low GWP Refrigerants to Reduce Carbon Footprint in Data Centers (CRADAChemours); **Samuel Yana Motta, ORNL**		ET - BEADS; REST NET: Residential Energy Storage Transition and Network Efficiency Tactics; **Joshua Land, Channing Street Copper**	ET - Connected Communities; Portland General Electric; **Matt Hubbard**	CBI - See the Savings: An Advanced Window-Lighting Controls Demonstration; **Kathryn Kuntz, Dane County, WI**
3:40-4:00 PM	Break				
4:00-4:40 PM	ET - HVAC; Refrigerant Leak Detection; **Daniel Deng, Christian Valoria, PNNL**		**ORNL**, IBUILD 1-6 (15-min presentations by 6 fellows)	ET - Connected Communities; Post Road Foundation; **Seth Hoedl**	CBI - Field Testing & Validation - Thermal Energy Storage in Public and Commercial Buildings in Sumner County, Kansas For Energy Savings, Demand Reduction and Flexibility; **Barry Dicker, Decent Energy Inc.**
4:40-5:20 PM	ET - HVAC; Low GWP Refrigerant Leak Sensing Methods for Commercial Refrigeration; **Vishal Sharma, ORNL**			ET - Connected Communities; UC Irvine/SunPower Corporation; **Kate Forrest**	CBI - Advanced Grid Responsive Technologies for Existing Multifamily Properties; **Joseph Teng, Austin Energy**
5:20-6:00 PM				ET - Connected Communities; Connected Communities National Coordinator; **Cindy Regnier, LBNL, Paul Francik, PNNL**	CBI - Highly Efficient gas Absorption Technology for Energy Reductions (HEATER); **Mark Finlay, State of Tennessee**
End of Peer Review					

POSTER HALL LAYOUT

Independence Level



POSTERS

As of 10/15/2024

Poster #	Track	Project Title	Presenter	Organization
1	Building Energy Codes	Reducing Energy Code Variability Using Energy Credits	Michael Tillou	PNNL
2	Building Energy Codes	Toward More Equitable Building Energy Codes	Chitra Nambiar	PNNL
3	Building Energy Codes	Building Energy Code Technical Assistance Under the Bipartisan Infrastructure Law/Infrastructure Investment and Jobs Act (BIL/IIJA)	Paula Zimin	PNNL
4	Building Energy Codes	From Policy to Practice: Supporting Jurisdictions in Development and Implementation of Building Performance Standards	Molly Curtz	PNNL
5	Building Energy Codes	Impact of Resilient and Efficiency Code Implementation (RECI) Project Awards	Kim Cheslak	PNNL
6	Building Energy Codes	Using Artificial Intelligence (AI) for Energy Code Compliance Verification	Hanlong Wan	PNNL
7	Building Energy Codes	Compliance Portal: Connecting New Building Design and Performance with Building Codes and Standards	Weili Xu	PNNL
8	Building Energy Codes - Emerging Technologies - Building Energy Modeling	Standard 229 Ruleset Verification	Weili Xu	PNNL
9	Commercial Buildings Integration	Smart Labs for Higher Education & Healthcare	Rachel Romero	NREL
10	Commercial Buildings Integration	Commercial Buildings Research Infrastructure (CBRI) Capabilities and Projects	Grant Wheeler	NREL
11	Commercial Buildings Integration	Data Driven Sustainability for Buildings	Kate Hickcox	PNNL
12	Commercial Buildings Integration	Integration & Optimization of Building Loads for Grid-interactive Efficient Buildings	Jamie Lian	ORNL/CenterPoint Energy
13	Commercial Buildings Integration	Field Validation of Variable Refrigerant Flow System Performance in Cold Climates	Dave Lis, Greg Goodyear	Northeast Energy Efficiency Partnerships/Ridgeline Energy Analytics
14	Commercial Buildings Integration	Technology Analysis and Validation of Integrating Connected Lighting, Automated Shades, and Intelligent Energy Storage for Load Flexibility	Scott Hackel	Slipstream Group, Inc.
15	Residential Buildings Integration	Solar Decathlon International	Taylor Ryan	NREL
16	Residential Buildings Integration	Blending Behavioral Science and Physics-Based Models to Inform Equitable Decarbonization in the U.S. Housing Stock	Kieren McCord	PNNL/NREL
17	Residential Buildings Integration	Building America Solution Center	Chrissi Antonopoulos	PNNL
18	Residential Buildings Integration	Building Science Advisor	Andre Desjarlais	ORNL
19	Residential Buildings Integration	Heat Pump/Heat Pump Water Heater (HP/HPWH) Database	Abinesh Selvacanabady	PNNL
20	Emerging Technologies - Building Electric Appliances, Devices, and Systems	Grand Prize Winner, EAS-E Home Electrification Prize: Modular Multi-Function Air-to-Water Heat Pump Systems for Expedited and Affordable Home Electrification	Jonathan Woolley	Aris Hydronics

Poster #	Track	Project Title	Presenter	Organization
21	Emerging Technologies - Building Electric Appliances, Devices, and Systems	Battery Embedded Appliances	Joshua Land	Channing Street Copper
22	Emerging Technologies - Building Electric Appliances, Devices, and Systems	Advances in Electrical Panel Capacity Constraints and Low Power Electrification	Xin Jin, Alan Meier	NREL/LBNL
23	Emerging Technologies - Envelope	A Novel Transient Infrared (IR) Imaging to Detect and Quantify Building Air Leakage	Zhenglai Shen	ORNL
24	Emerging Technologies - Envelope	Using Non-Invasive Scanning for Envelope Assessments with LiDAR Enhanced Diagnostics and Air Infiltration Results (UNSEALED-AIR)	Nicholas Houchois	Hearth Labs
25	Emerging Technologies - Envelope	Real-Time Building Air Leakage Visualizer	Michael Hargather	New Mexico Institute of Mining and Technology
26	Emerging Technologies - Envelope	Innovative Aerosol Sealing of Occupied Residences	David Bohac	Center for Energy and Environment
27	Emerging Technologies - Thermal Energy Storage	Thermal Storage-Ready High-Performance Multi-Split Heat Pump System	Allison Mahvi	University of Wisconsin–Madison
28	Emerging Technologies - Thermal Energy Storage	Low Cost and High-Performance Modular Thermal Energy Storage for Building Equipment	Amir Shooshtari	University of Maryland, College Park
29	Emerging Technologies - Thermal Energy Storage	Multi-Functional HVAC Platform with Modular Thermal Storage	Jason Born, Juan Catano	Copeland/NREL
30	Emerging Technologies - Thermal Energy Storage	Design and Integration of Thermochemical Energy Storage (TCES) into Buildings for Load Shedding/Shifting	Akanksha Menon	Georgia Tech
31	Emerging Technologies - Windows	Opportunities for Advanced Windows - Analysis, Thin Triple, Vacuum Insulated Glazing (VIG)	Robert Hart	LBNL/NREL/ORNL/PNNL
32	Emerging Technologies - Windows	Low Income Shading	Luis Fernandes	LBNL/PNNL
33	Emerging Technologies - Windows	Enhanced Durability of Windows	Robert Tenent	NREL
34	Emerging Technologies - Windows	Spandrel	Mahabir Bhandari	ORNL/LBNL
35	Emerging Technologies - Heating, Ventilation, and Air Conditioning	A Platform to Decarbonize Multifamily Housing with Adaptive Battery Optimization Creating a Resilient and Equitable Electrical Grid	Anthony Keslinke	Veritel Energy
36	Emerging Technologies - Heating, Ventilation, and Air Conditioning	Virtual Power Plant Utilization to Drive Energy Efficiency & Power Market Optimization for Multifamily Buildings	Uche Isiugo	Infranergy
37	Emerging Technologies - Heating, Ventilation, and Air Conditioning	Molecular Air Conditioner	William Becchina	Energy Wall
38	Emerging Technologies - Heating, Ventilation, and Air Conditioning	Next Generation Liquid-to-Refrigerant Heat Exchangers for Heat Pumps, Water Heaters, and Refrigeration Systems	Vikrant Aute	University of Maryland
39	Emerging Technologies - Heating, Ventilation, and Air Conditioning	Enabling Vapor Injection Compressors in Next Generation Heat Pumps	Dennis Nasuta	OTS R&D, Inc.
40	Emerging Technologies - Heating, Ventilation, and Air Conditioning	Reduced Cost Heat Pump Space and Water Heating in Cold Climates	Jubair Shamim, Kashif Nawaz	ORNL
41	Emerging Technologies - Heating, Ventilation, and Air Conditioning	Analysis of Frost Formation and Novel Defrost Techniques for Commercial Refrigeration Applications (CRADA with DFR/HillPhoenix)	Peter Wang, Kashif Nawaz	ORNL

Poster #	Track	Project Title	Presenter	Organization
42	Emerging Technologies - Heating, Ventilation, and Air Conditioning	A Highly Efficient Thermo-Vacuum Clothes Dryer	Peter Wang, Kashif Nawaz	ORNL
43	Emerging Technologies - Heating, Ventilation, and Air Conditioning	Next-Generation Transcritical CO2 Refrigeration	Brian Fricke	ORNL
44	Emerging Technologies - Heating, Ventilation, and Air Conditioning	Development of a CO2 Chiller Heat Pump for Multiple North American Applications	Brian Fricke	ORNL
45	Emerging Technologies - Heating, Ventilation, and Air Conditioning	Separate Sensible and Latent Air Conditioning (AC) System	Kai Li, Kashif Nawaz	ORNL
46	Emerging Technologies - Heating, Ventilation, and Air Conditioning	Cast Heat Exchanger Using the Novel Ce-Al Alloy	Jamieson Brechtl, Kashif Nawaz	ORNL
47	Emerging Technologies - Heating, Ventilation, and Air Conditioning	FY 19 BENEFIT - Heat Exchanger for Next Generation (NG) Heat Pump	Jamieson Brechtl, Kashif Nawaz	ORNL
48	Emerging Technologies - Heating, Ventilation, and Air Conditioning	Ionic Liquids as Novel Lubricant Additives for HVAC Compressors for Enhanced Efficiency and Durability	Jun Qu, Brian Fricke	ORNL
49	Emerging Technologies - Heating, Ventilation, and Air Conditioning	Identification of Gaps in Safety Guidelines for the Implementation of Flammable Low GWP Refrigerants	Samuel Yana Motta, Brian Fricke	ORNL
50	Emerging Technologies - Heating, Ventilation, and Air Conditioning	Next-Generation Nature-Inspired Variable-Capacity Evaporators for Low-GWP Blended Refrigerants	Sajjad Bigham	North Carolina State University
51	Emerging Technologies - Heating, Ventilation, and Air Conditioning	Thermoelectric Heat Pump Water Heater Priced for Mass Market Deployment With 30% Less CO2	Kyle Gluesenkamp	ORNL
52	Emerging Technologies - Heating, Ventilation, and Air Conditioning	Evaluation of Low Environmental Impact Distributed Scroll Booster Technology for Supermarket Refrigeration	Junjie Luo, Vishal Sharma	ORNL
53	Emerging Technologies - Heating, Ventilation, and Air Conditioning	Novel Heat Exchanger Design Based on Porous Materials (CRADA Baltimore Air Coil (BAC))	Muneesh Murugan	ORNL
54	Emerging Technologies - Heating, Ventilation, and Air Conditioning	Water Heater Electrification	Ahmed Elatar, Joe Rendall	ORNL
55	Emerging Technologies - Heating, Ventilation, and Air Conditioning	Two-Phase Heat Transfer and Pressure Drop Characterization of Low Global Warming Potential Refrigerants, and Implementation on Heat Exchangers and System Models	Xudong Wang	Air-Conditioning, Heating, and Refrigeration Institute
56	Emerging Technologies - Heating, Ventilation, and Air Conditioning	Micro-Cascade Supermarket Refrigeration Using Low GWP Refrigerants (CRADA Honeywell)	Vishal Sharma	ORNL
57	Emerging Technologies - Heating, Ventilation, and Air Conditioning	Impact of Refrigerant Leaks From Zeotropic Refrigerant Based Commercial Refrigeration Systems	Vishal Sharma	ORNL
58	Emerging Technologies - Heating, Ventilation, and Air Conditioning	Flow Heat Transfer and Pressure Drop for Low GWP Refrigerants	Yifeng Hu, Cheng-Min Yang	ORNL
59	Emerging Technologies - Heating, Ventilation, and Air Conditioning	Smart Frost Sensor for HVAC Frost Diagnostics and Defrosting Control	Zhiming Gao, Jian Sun	ORNL

NOTES

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2024 PROJECT PEER REVIEW

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BUILDING TECHNOLOGIES OFFICE